

SN 10/824,691
Docket No. S-102,389
In Response to Office Action dated September 20, 2005

AMENDMENTS TO THE CLAIMS:

Please amend the claims as shown below. This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1-5. (cancelled)

6. (currently amended) A process for preparing a bulk, superhard, nanocomposite compact, comprising:

- (a) ball milling a mixture of graphite and hexagonal boron nitride to produce a ball-milled, the ball-milled mixture comprising amorphous boron nitride, nanocrystalline boron nitride or mixtures thereof, the ball-milled mixture further comprising amorphous carbon, nanocrystalline graphitic carbon or mixtures thereof;
- (b) encapsulating the ball-milled mixture at a pressure in the range of from about 15 GPa to about 25 GPa; and
- (c) sintering the encapsulated ball-milled mixture at a temperature of about 1000-2500 K, thereby producing a bulk, superhard nanocomposite compact consisting essentially of nanocrystalline grains of at least one ternary phase of B-C-N surrounded by amorphous diamond-like carbon grain boundaries.

7. (original) The process of claim 6, wherein the ball milled mixture of graphite hexagonal boron nitride consists essentially of about 1-4 parts graphite to about 1 part hexagonal boron nitride.

8. (withdrawn) The process of claim 7, wherein the ball milled mixture of graphite and hexagonal boron nitride consists essentially of about 1 part graphite to about 1 part hexagonal boron nitride.

9. (withdrawn) The process of claim 7, wherein the ball milled mixture of graphite and hexagonal boron nitride consists essentially of about 2 parts graphite to about 1 part hexagonal boron nitride.

SN 10/824,691
Docket No. S-102,389
In Response to Office Action dated September 20, 2005

10. (original) The process of claim 7, wherein the ball milled mixture of graphite and hexagonal boron nitride consists essentially of 4 parts graphite to about 1 part hexagonal boron nitride.
11. (cancelled)
12. (original) The process of claim 7, wherein the encapsulated ball-milled mixture is sintered at a pressure of about 15-25 GPa and at a temperature of about 2000-2500 K.
13. (original) The process of claim 7, wherein the encapsulated ball-milled mixture is sintered at a pressure of about 16-25 GPa and at a temperature of about 2100-2500 K.
14. (original) The process of claim 7, wherein the encapsulated ball-milled mixture is sintered at a pressure of about 20-25 GPa and at a temperature of about 2000-2500 GPa.
15. (original) The process of claim 7, wherein the encapsulated ball-milled mixture is sintered at a pressure of about 20-25 GPa and at a temperature of about 2100-2400 K.
16. (original) The process of claim 7, wherein the encapsulated ball-milled mixture is sintered at a pressure of about 20 GPa and at a temperature of about 2000-2400 K.
17. (withdrawn) The process of claim 7, wherein the encapsulated ball-milled mixture is sintered at a pressure of about 25 GPa and at a temperature of about 2100-2300 K.
18. (previously presented) The process of claim 6, wherein step (b) comprises encapsulating the ball-milled mixture in capsule comprising platinum, gold, rhenium, or boron nitride.
19. (original) The process of claim 7, wherein said compact has a Vickers hardness of about 41-68 GPa.
20. (original) The process of claim 7, wherein said compact has a Vickers hardness of about 50-68 GPa.
21. (original) The process of claim 7, wherein said compact has a Vickers hardness of about 62-68 GPa.

SN 10/824,691
Docket No. S-102,389
In Response to Office Action dated September 20, 2005

22. (original) The process of claim 7, wherein said compact has a Vickers hardness of 68 GPa.

23-43. (cancelled)